CLAIMS

1. Energy storage device (10) comprising at least one anode (5), a dielectric (4) and a cathode (3), in which the elements (2, 3, 4, 5) are coated in part at least by a protective layer (7) formed of a metal or metal alloy having a sufficient thermomechanical resistance to absorb thermomechanical deformations without causing fissures to appear, the metal or the metal alloy having an expansion coefficient less than $6.10^{-6}\,°C^{-1}$.

2. Device according to claim 1, the protective layer (7) being formed of a metal chosen among the group: W, Ta, Mo, Zr.

3. Device according to claim 1, the protective layer (7) being formed of a nitrated alloy chosen among the group: WN_x, TaN_x, MoN_x, ZrN_x, TiN_x, AlN_x, where $x<1$.

4. Device according to one of claims 1 to 3 comprising at least one other protective layer (7) formed of a metal or metal alloy having a sufficient thermomechanical resistance to absorb thermomechanical deformations without causing fissures to appear.

5. Device according to claim 4 wherein another protective layer (7) is formed of a metal having a Vickers hardness less than 50.

6. Device according to claim 5 wherein the metal is chosen among the group: Pd, Pt, Au.

7. Device according to one of claims 1 to 6 further comprising an electrically insulating layer (6).

8. Device according to claim 7 wherein the insulating layer (6) is located between the elements (2, 3, 4, 5) of the device and the metallic protection layer(s) (7).

9. Device according to claim 7 or 8 wherein the insulating layer (6) is an oxide.

10. Device according to claim 9 wherein the oxide is chosen among the oxides of Mg, Ca, Be, Ce, Si, Al, Ta and La.

11. Device according to claim 7 or 8 wherein the insulating layer is a sulphide, such as ZnS.

12. Device according to claim 7 or 8 wherein the insulating layer is a nitride.

13. Device according to claim 12 wherein the nitride is chosen among Si_3N_4 and BN.

14. Device according to claim 7 or 8 wherein the insulating layer is a carbide.

15. Device according to claim 14 wherein the carbide is chosen among SiC, B_4C, WC.

16. Device according to one of the previous claims wherein the elements (2, 3, 4, 5) are encapsulated in the protecting and/or insulating layer(s) (6, 7).

17. Method for protecting an energy storage device comprising the coating of a part at least of the device by a protective layer (7) formed of a metal or metal alloy having a sufficient thermomechanical resistance to absorb thermomechanical deformations without causing fissures to appear, the metal or the metal alloy having an expansion coefficient less than $6.10^{-6\circ}C^{-1}$.

18. Method according to claim 17 comprising the coating of a part at least of the device by a protective layer formed of a metal having a Vickers hardness less than 50.

19. Method according to claim 17 or 18 where the coatings are formed by physical vapour deposition or evaporation.

20. Method according to one of claims 17 to 19 comprising, prior to the coating(s) by metallic layer(s), the step of coating by an electrically insulating layer.

21. Method according to claim 20 in which the insulating layer is a ceramic chosen among ZnS, Si_3N_4, BN, SiC, B_4C, WC, $MgAl_2O_4$ and the oxides of Mg, Ca, Be, Ce, La, Si, Al or Ta.

22. Method according to one of claims 20 or 21 wherein the coating by an insulating layer is carried out by physical vapour deposition, radiofrequency sputtering or ion beam sputtering.

23. Method according to one of claims 20 to 22 comprising, prior to the coating by the insulating layer, a step of pre-encapsulation.

24. Method according to claim 23 comprising the elimination of the pre-encapsulation layer before the coating by the insulating layer.

25. Method for protecting a microbattery comprising the encapsulation of the microbattery by one of the methods according to one of claims 17 to 24.